

Claims

There is claimed:

1. An electronic push-pull amplifier having an output stage, which output stage further has at least one sourcing active  
5 output device for sourcing a sourcing current to a load through a sourcing current path, and at least one sinking active output device for sinking a sinking current from the load through a sinking current path, comprising
  - a sourcing current sense resistor for facilitating sensing  
10 of the sourcing current through the output stage sourcing current path of the push-pull amplifier, the sourcing current sense resistor being located in the output stage sourcing current path,
  - a sinking current sense resistor for facilitating sensing  
15 of the sinking current through the output stage sinking current path of the push-pull amplifier, the sinking current sense resistor being located in the output stage sinking current path,
  - a quiescent current control means for controlling a  
20 quiescent current through the output stage sourcing current path and sinking current path in response to the least one of the sourcing current and the sinking current through the output stage sourcing current path and sinking current path, respectively,  
25 whereby output impedance and crossover distortion are reduced.
2. An electronic push-pull amplifier according to claim 1 further comprising
  - a sourcing drive circuit for producing an output stage  
30 sourcing signal directly referenced to a shared terminal of the sourcing active output device and
  - a sinking drive circuit for producing an output stage

sinking signal directly referenced to a shared terminal of the sinking active output device.

3. An electronic push-pull amplifier according to claim 2 wherein the sourcing drive circuit produces a voltage that is applied directly between a gate terminal and a source terminal of the sourcing active output device, and wherein the sinking drive circuit produces a voltage that is applied directly between a gate terminal and a source terminal of the sinking active output device.

4. A method of reducing output impedance and crossover distortion in an electronic push-pull amplifier having an output stage, which output stage further has at least one sourcing active output device for sourcing a sourcing current through a sourcing current path, and at least one sinking active output device for sinking a sinking current through a sinking current path, comprising the steps of:

- sensing the sourcing current through the sourcing current path of the output stage, by sensing a first voltage across a sourcing sense resistor arranged in the sourcing current path of the output stage,

- sensing the sinking current through the sinking current path of the output stage, by sensing a second voltage across a sinking sense resistor arranged in the sinking current path of the output stage,

- producing in response to the sourcing current and the sinking current a bias control signal representative of the least one of the sourcing current and the sinking current, said bias control signal being proportional to the least one of the sourcing current and the sinking current,

- controlling a sourcing bias voltage and a sinking bias voltage in response to the bias control signal,

- referencing a sourcing output stage control signal applied at a gate or base terminal of the sourcing active output

device directly to a shared terminal of the sourcing active output device, and

- referencing a sinking output stage control signal applied at a gate or base terminal of the sinking active output

5 device directly to a shared terminal of the sinking active output device.

5. The method of claim 4 further comprising the steps of

- creating a first bias control signal in response to a

voltage across the sourcing sense resistor, thus representing

10 a current through the sourcing active output device, and

- creating a second bias control signal in response to a

voltage across the sinking sense resistor, thus representing

a current through the sinking active output device.

6. The method of claim 5 further comprising the steps of

15 - sourcing and sinking a current through a resistor, said

current representing the least one of the output stage

sourcing current and the output stage sinking current,

- sensing a voltage across said resistor for producing a biasing control voltage, and

20 - producing symmetric bias voltages inversely proportional to said biasing control voltage.